

What is claimed is:

1. A composition comprising a mucin peptide and a biodegradable polymeric microsphere.
2. The composition of claim 1, wherein the mucin peptide comprises a MUC-1 peptide.
- 5 3. The composition of claim 2, wherein the MUC-1 peptide comprises at least two tandem repeats of the 20mer sequence, GVT SAPDTRPAPGSTAPPAH (SEQ ID NO: 1).
4. The composition of claim 3, wherein the MUC-1 peptide comprises 2, 3, 4, 5, 6 or 7 tandem repeats of the 20mer sequence, GVT SAPDTRPAPGSTAPPAH (SEQ ID  
10 NO: 1).
5. The composition of claim 1, wherein the microsphere comprises poly(lacto-co-glycolide) (PLG), poly(lactide), poly(caprolactone), poly(hydroxybutyrate) and/or a copolymer thereof.
6. The composition of claim 5, wherein the microsphere comprises poly(lacto-co-glycolide) (PLG).  
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7. The composition of claim 1, further comprising an adjuvant and/or a saponin.
8. The composition of claim 7, wherein the adjuvant is selected from the group consisting of MPL, an aminoalkyl glucosaminide 4-phosphate (AGP), and 2-deoxy-2-amino-beta-D-glucopyranose (glucosamine) glycosidically linked to a cyclic  
20 aminoalkyl (aglycon) group (cyclic AGP); and the saponin is selected from the group consisting of QuilA, QS-21 and GPI-100.
9. The composition of claim 1, which comprises a plurality of microspheres and wherein at least about 90% of the microspheres are from about 1  $\mu\text{m}$  to about 20  $\mu\text{m}$ .

10. The composition of claim 9, wherein at least about 90% of the microspheres are from about 3  $\mu\text{m}$  to about 10  $\mu\text{m}$ .
11. The composition of claim 10, wherein at least about 90% of the microspheres are from about 6  $\mu\text{m}$  to about 8  $\mu\text{m}$ .
- 5 12. A method for encapsulating mucin peptides in microspheres comprising:
  - (a) dissolving a polymer in a solvent to form a polymer solution;
  - (b) adding an aqueous solution containing mucin peptides to the polymer solution to form a primary emulsion;
  - (c) homogenizing the primary emulsion;
  - 10 (d) mixing the primary emulsion with a process medium comprising a stabilizer to form a secondary emulsion; and
  - (e) extracting the solvent from the secondary emulsion to form microspheres encapsulating mucin peptides.
- 15 13. The method of claim 12, wherein the polymer comprises poly(lacto-co-glycolide) (PLG), poly(lactide), poly(caprolactone), poly(hydroxybutyrate) and/or a copolymer thereof.
14. The method of claim 13, wherein the PLG has a molecular weight of from about 8 kDa to about 65 kDa.
- 20 15. The method of claim 12, wherein the polymer solution further comprises an adjuvant and/or a saponin.
16. The method of claim 15, wherein the adjuvant comprises MPL, AGP or cyclic AGP; and the saponin comprises QuilA, QS-21 or GPI-100.
17. The method of claim 12, wherein the mucin peptide comprises MUC-1.

18. The method of claim 12, wherein at least about 90% of the microspheres are from about 1  $\mu\text{m}$  to about 20  $\mu\text{m}$ .
19. The method of claim 18, wherein at least about 90% of the microspheres are from about 3  $\mu\text{m}$  to about 10  $\mu\text{m}$ .
- 5 20. The method of claim 19, wherein at least about 90% of the microspheres are from about 6  $\mu\text{m}$  to about 8  $\mu\text{m}$ .
21. An encapsulated mucin peptide produced by the method of claim 12.
22. A vaccine comprising the composition of claim 1 or the mucin peptide of claim 21 and a pharmaceutically acceptable carrier.
- 10 23. The vaccine of claim 22, further comprising an adjuvant and/or a saponin.
24. The vaccine of claim 23, wherein the adjuvant comprises MPL, AGP or cyclic AGP; and the saponin comprises QuilA, QS-21 or GPI-100.
25. A method for delivering a mucin peptide to a subject comprising administering to the subject a vaccine of claim 22.
- 15 26. A method of stimulating an immune response to MUC-1 in a subject comprising administering a vaccine of claim 22 to the subject.
27. A method of inhibiting tumor growth in a subject having a cancer associated with reduced glycosylation of MUC-1 comprising administering a vaccine of claim 22 to the subject.
- 20 28. A method of prolonging survival in a subject having a cancer associated with reduced glycosylation of MUC-1 comprising administering a vaccine of claim 22 to the subject.
29. A method of treating or preventing a cancer associated with reduced glycosylation of MUC-1 comprising administering a vaccine of claim 22 to the subject.